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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
LEE, BENNY T

ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES DEPARTMENT OF COMMERCE
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SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.

EXAMINER	
ART UNIT	PAPER NUMBER
	7

DATE MAILED:

This is a communication from the examiner in charge of your application.

COMMISSIONER OF PATENTS AND TRADEMARKS

☒ This application has been examined ☐ Responsive to communication filed on _____ ☐ This action is made final.

A shortened statutory period for response to this action is set to expire three (3) month(s), _____ days from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☐ Notice re Patent Drawing, PTO-948.
3. ☒ Notice of Art Cited by Applicant, PTO-1449
4. ☐ Notice of Informal Patent Application, Form PTO-152
5. ☐ Information on How to Effect Drawing Changes, PTO-1474
6. ☐ _____

Part II SUMMARY OF ACTION

1. ☒ Claims 1-28 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. ☐ Claims _____ have been cancelled.

3. ☐ Claims _____ are allowed.

4. ☒ Claims 1-16; 17, 20-23, 27; 28 are rejected.

5. ☒ Claims 18, 19, 24-26 are objected to.

6. ☐ Claims _____ are subject to restriction or election requirement.

7. ☐ This application has been filed with informal drawings which are acceptable for examination purposes until such time as allowable subject matter is indicated.

8. ☐ Allowable subject matter having been indicated, formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on _____. These drawings are ☐ acceptable; ☐ not acceptable (see explanation).

10. ☐ The ☐ proposed drawing correction and/or the ☐ proposed additional or substitute sheet(s) of drawings, filed on _____. has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed _____, has been ☐ approved. ☐ disapproved (see explanation). However, the Patent and Trademark Office no longer makes drawing changes. It is now applicant's responsibility to ensure that the drawings are corrected. Corrections MUST be effected in accordance with the instructions set forth on the attached letter "INFORMATION ON HOW TO EFFECT DRAWING CHANGES", PTO-1474.

12. ☐ Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. _____; filed on _____.

13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ☐ Other

PTOL-326 (Rev. 7-82) EXAMINER'S ACTION

SN 989528

The disclosure is objected to because of the following informalities: Page 5, lines 7, 8, note that "missmatch" should be correctly spelled as--mismatch--; line 9, note that a --,-- should follow "component " and "stage", respectively

Appropriate correction is required.

The disclosure is objected to because of the following informalities: Note that the following reference labels need to be described in the corresponding figure description: fig. 2 (240); fig. 3 (340); fig. 8 (840, 854).

Appropriate correction is required.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the control circuit coupled to the low loss port as recited in claim 8 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the supply circuit coupled to the high-loss port as recited in claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6-9, 1-13, 15, 16; 17, 20-23, 27; 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kerley in view of the UK reference.

Kerley (fig. 3) discloses an AC signal switch comprising a power splitter configured using a directional coupler (302). Note the directional coupler comprises an input signal applied to a port adjacent input transmission line (304). The transmission lines (310, 316) define at least one "low-loss" primary line of the directional coupler (302) between the common input signal and

low loss output signal (OUT 1). Note that at least one "high" coupled line (312, 314) includes a "high-loss" output (OUT 2) at one end of the coupled line while the opposite "isolated" end of the coupled line is terminated to an AC ground. As described at col. 4, l.58, the coupling between the primary and coupled lines (e.g. 310, 312) has a coupling factor of 8.34 dB. Thus, as known to those of ordinary skill in the art, a coupling factor of 3dB corresponds to an equal power split between the primary and coupled lines. Therefore, it would stand to reason that power splits other than 3dB would be unequal with the energy coupled being reduced in the coupled line (e.g. by 8.34) thereby resulting in a "high-loss" path. Note that a shunt switching element (i.e. diode 318) has one terminal thereof coupled to the low loss output lie (306) adjacent output (OUT 1) and the other terminal terminated to AC ground. A control circuit (not shown) inherently would have applied a bias control (DC BIAS 1) to switch the diode (318) to AC ground. Furthermore, note that a DC supply (not shown) inherently would have applied a DC voltage (DC BIAS 2) to the coupled line (314) at the isolated end of the coupled line.

Kerley fundamentally differs from the claimed invention in that the shunt diode switching element (318) is not terminated to AC ground by a termination element whose characteristic impedance matches of the unequal splitter when the switch is turned on.

The UK reference discloses an exemplary switching system whose primary benefit is to terminate to ground an unelected element (2) via a switch connection (9) to a resistor (10) whose characteristic impedance matches that of the unelected element. As known to those of ordinary

skill in the art, a matched impedance termination avoids undesired signal reflections as compared to unmatched (e.g. open/short circuit) termination.

Accordingly, it would have been obvious in view of the references, taken as a whole, to have modified the shunt switching element of Kerley by adding a matched impedance termination between the switching element and AC ground as exemplarily taught by the UK reference.

Accordingly, in operation, when the input signal is desired for a specific path (i.e. primary or coupled), the corresponding diode switching element for the other path is turned on and the other path is shunt terminated to AC ground via a matched termination. Such a modification would have imparted the benefit of a matched termination (i.e. no reflections) for an unselected signal path, as exemplarily taught in the UK reference as compared to undesired reflections which may occur if the diode switch is turned on and directly connected to AC ground, thereby suggesting the obviousness of the combination.

With regards to claims 15, 16, 20-23, 27 although the Kerley reference does not explicitly reference to it's use with antennas, those of ordinary skill in the art would have recognized that AC switches of the type in Kerley are commonly and conventionally used in antenna applications. Note that the placement of antenna(s) relative to particular ports dictates their particular application. For example, an antenna at the common (i.e. input signal) port may suggest transmit/receive (e.g. mobile phone as per claim 27) operation whereas placement of antenna(s) at one or more output ports would have suggested multi-channel selection.

Accordingly, given what was previously stated, it would have been obvious to have concluded that the use of the AC switch of the combination in antenna applications would have been an obvious design consideration.

Claims 5, 10, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the preceding rejection as applied to claims 4, 9, 11, respectively above, and further in view of Goldman et al (cited by applicants').

The above combination meets the claimed invention except for: the isolated port being terminated by a characteristic impedance matched termination; and the control and DC supply circuits including a low pass filter.

Goldman et al (Fig. 4) discloses a microwave coupler circuit which includes inter alia a terminating resistor (55) which couples the isolated port of coupled line (18) to ground and a low pass filter comprising inductor (66) and shunt capacitor (68) arranged such as to decouple microwave energy in the coupler from DC terminal (72).

Accordingly, it would have been obvious in view of the references, taken as a whole, to have: added a terminating resistor to the isolated port of the coupled line in the AC switch combination; and to have added low pass filters to the DC circuits providing control voltages (DC BIAS 1) and DC supply voltages (DC BIAS 2). Such modifications would have been considered obvious since terminating isolated ports in matched terminations provides the obvious benefit of preventing undesired signal reflections back into the switch, coupler and placing a low

pass filter in the DC circuits obviously provides decoupling of DC voltages and the microwave signals of the switch coupler, thereby suggesting the obviousness of such a combination.

Claims 18, 19, 24-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Catoiu pertains to a 3:1 splitter/combiner.

Any inquiry concerning this communication should be directed to Benny Lee at telephone number (703) 308-4902.

Benny Lee

BENNY T. LEE
PRIMARY EXAMINER
ART UNIT 2817

B LEE/pj

05/16/03